



**THE COUNCIL OF COMMUNITY COLLEGES OF JAMAICA**

**ASSOCIATE OF SCIENCE EXAMINATION**

**SEMESTER I – 2012 DECEMBER**

**PROGRAMMES: AUTOMOBILE REPAIRS AND ENGINEERING**

**COURSE NAME: AUTO CHASSIS SYSTEMS II**  
**CODE: (AUTO2303)**

**YEAR GROUP: ONE**

**DATE: THURSDAY, 2012 DECEMBER 20**

**TIME: 1:00 P.M. – 4:00 P.M.**

**DURATION: 3 HOURS**

**EXAMINATION TYPE: FINAL**

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*This Examination paper has 6 pages*

**INSTRUCTIONS:**

**SECTION A: ANSWER ANY FOUR (4) QUESTIONS IN THIS SECTION.**

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.**

**SECTION A**

***Instructions: Answer ANY FOUR (4) questions in this section.***

**Question 1**

- a. List the **two (2)** general types of power brake boosters used on motor vehicles to assist brake pedal application and describe **one (1)** type. ***(3 marks)***
- b. Name the **two (2)** organizations that write specifications for brake fluid. ***(1 mark)***
- c. State **two (2)** desirable properties of a brake fluid. ***(1 mark)***
- d. What is a longitudinally split brake system? ***(2 marks)***
- e. Why are disc wheels vented? ***(1 mark)***
- f. Many brake systems use control valves to regulate the pressure going to each wheel cylinder. Name the **two (2)** types of brake system control valves and explain the operation of each. ***(3 marks)***
- g. Almost all brake system problems can be sorted into several basic categories such as: brake pedal vibration, grabbing brakes, excessive brake pedal effort, pulling brakes, spongy brake pedal, dropping brake pedal, low brake pedal, Dragging brakes, no brake pedal, and brake warning light on. Explain any **two (2)** of the above brake system problems. ***(4 marks)***
- h. The brake system must be free of air to function properly. Explain manual bleeding. ***(2 marks)***
- i. Complete the following:
  - i. List **four (4)** major parts of a typical anti-lock brake system explain the operation of any two parts. ***(6 marks)***
  - ii. Describe the operation of an anti-lock braking system. ***(2 marks)***

***(Total 25 marks)***

**Question 2**

- a. A suspension system has several important functions. Name **two (2)** of these functions and state the component/s in the suspension system that is/are responsible for each named function. **(2 marks)**
- b. Suspension systems may be grouped into two broad categories: Independent and non-independent. Make a comparison of both systems. **(2 marks)**
- c. Suspension system springs must jounce and rebound as vehicle travels over bumps and holes in the road surface. List **four (4)** of the most common types of springs and describe **two (2)** types. **(4 marks)**
- d. There are two basic kinds of steering systems in wide use today: Linkage (worm gear)/parallelogram steering linkage and rack-and-pinion steering system. Name **two (2)** main components of each system and explain any **one (1)** of each system function. **(6 marks)**
- e. The main purpose of wheel alignment is to make the tires roll without scuffing, slipping, or dragging under all operating conditions. Six fundamental angles or specifications are needed for proper wheel alignment.
- i. List **four (4)** of them. **(4 marks)**
  - ii. Explain **two (2)** of these angles and their effect on wheel alignment (include in your answer: definitions, purposes). **(4 marks)**
- f. Tire markings on the sidewall of a tire give information about: the tire size, tire model, load-carrying ability, inflation pressure, number of plies, etc.
- i. Which of the above markings does “205/50/R-16” represent? **(1 marks)**
  - ii. Give the meaning of the above alpha-numeric representation. **(2 marks)**

**(Total 25 marks)**

**Question 3**

- a. Damaged or worn clutch parts can cause a variety of clutch problems such as, slipping, grabbing, dragging, abnormal noises, and vibration. State the symptoms produced by any **two (2)** of these problems and name the parts that may be the cause. **(4 marks)**
- b. Clutch adjustment involves setting the correct amount of free travel (free play) in the release mechanism.
- i. Define the term clutch pedal “free play”. **(1 mark)**
  - ii. Name the **three (3)** basic types of clutch release mechanism. **(2 marks)**
  - iii. Explain the process of adjusting any one of the above clutch release mechanism. **(2 marks)**
- c. Some of the common manual transmission problems are: Gears grind when shifting, transmission noise, transmission difficult to shift, transmission jumps out of gear, transmission leaks lubricant, and transmission locked in gear.
- i. Explain the causes of **two (2)** of the above manual transmission problems. **(4 marks)**
  - ii. List **four (4)** basic parts of a manual transmission. State the purpose of each. **(4 marks)**
  - iii. State **two (2)** purposes of the manual transmission. **(2 marks)**
  - iv. What is gear backlash? **(1 mark)**
  - v. State **two (2)** purposes of gear backlash. **(2 marks)**
  - vi. List the **four (4)** steel shafts that are mounted inside the manual transmission case. **(2 marks)**

**(Total 25 marks)**

**Question 4**

- a. An automatic transmission uses three methods to transmit power. Name **two (2)** of them. **(2 marks)**
- b. There are three devices that are used to hold a planetary gearset member. Name **two (2)**. **(2 marks)**
- c. Some of the common automatic transmission problems are: automatic transmission slippage, incorrect shift point, and mushy shifts or harsh shifts. Explain one of the above. **(2 marks)**
- d. Various shop tests are used when the preliminary checks and the road test fail to locate the transmission problem. There are three (3) main shop tests, name **two (2)**. **(2 marks)**
- b. Explain how to perform any **two (2)** of the three shop tests. **(4 marks)**
- e. Explain the procedure for changing automatic transmission oil, considering that there is an oil sump on the transmission. **(4 marks)**
- f. Define the term transaxle. **(1 mark)**
- g. A front-engine vehicle having a transaxle and front-wheel drive has several advantages as well as disadvantages when compared with a front-engine vehicle with rear-wheel drive. State **two (2)** advantages and two disadvantages. **(4 marks)**
- h. Drive shaft problems can normally be divided into two categories: drive shaft noise and drive shaft vibration. Explain both categories. **(4 marks)**

**(Total 25 marks)**

**Question 5**

- a. List the **seven (7)** basic steps for wheel alignment. **(5 marks)**
- b. There are many types of alignment equipment in use today. However, the alignment principles are the same regardless of the equipment used. Based on the type that you are exposed to, explain the procedure to follow when using the alignment machine (alignment rack) to align a motor car. Make sure your explanation covers, from driving the vehicle on to the alignment rack, to rolling the vehicle off the alignment rack. **(10 marks)**
- c. Explain the procedure to follow in balancing a car wheel using the off-car wheel balancing machine. Make sure to include wheel preparation prior to balancing as well as safety rules to follow. **(5 marks)**
- d. When mounting or dismounting a tire on its wheel, a tire changing machine is used to force the tire on and off the wheel. Explain the procedure to follow when removing and replacing a tire on a rim. Ensure that safety rules are mentioned in the procedure. **(5 marks)**

**(Total 25 marks)**

**END OF EXAMINATION**